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# Canning Sweetpotatoes for School Lunch and Institutional Use

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These instructions for canning sweetpotatoes in tin containers were written specifically for use in school, community, and institutional canneries. They should be used as a guide when processing sweetpotatoes distributed through the U.S. Department of Agriculture's program to remove surplus agricultural commodities from the market.

Sweetpotatoes distributed under the U.S. Department of Agriculture's program to remove surplus agricultural commodities from the market are sometimes purchased and distributed at the time of digging and sometimes later in the season after curing, depending on market conditions. Freshly dug sweetpotatoes are commonly used for canning, but the cured ones may be canned satisfactorily also. They will not be as firm, however, as freshly dug sweetpotatoes and the peeling and trimming losses may be somewhat higher.

## Varieties

A number of varieties of sweetpotatoes are satisfactory for canning. Among the better known are Porto Rico, Nancy Hall, Yellow Jersey, Big Stem Jersey, and Maryland Gold. The Porto Rico and Nancy Hall varieties, frequently referred to as "yams," are more orange in color than the other varieties and, when cooked, are moister and sweeter, as a general rule.

## Storage

Whether freshly dug or cured, sweetpotatoes should be canned as soon as possible after they are received. If it is necessary to hold them for a short period before processing, they should be stored under well-ventilated conditions at a temperature of 55° to 60° F. to prevent loss from spoilage. Care should be taken to avoid bruising sweetpotatoes, as they soft-rot quickly.

## CANNING IN TIN CONTAINERS

These instructions were written for school, community, and institutional canneries using tin containers. They cover the canning of sweetpotatoes in sirup and solid pack. If desired, sweetpotatoes may also be canned in water. However, they will not hold their shape as well, nor will their color and flavor be as good. If water is used, follow the directions given for sirup pack and add boiling water instead of sirup.

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The sirup pack is considered more acceptable than solid pack because it lends itself to a greater variety of uses. Furthermore, it takes less time for processing, thus permitting a greater daily output. Another advantage of the sirup pack is that processing may be done in No.10 cans, the size of containers most suitable for school lunch and institutional feeding programs. The No.10 can is not recommended for solid-packed sweetpotatoes since the processing time for a safe product would be excessively long. Such long processing results in an unacceptable product with a carmalized flavor and poor color.

## Type and Number of Cans

Use plain cans. Order them as soon as you know that you are to receive sweetpotatoes for canning. To insure getting the right type of can, specify in your order that the cans are to be used for sweetpotatoes. The number of cans needed will vary with the method of peeling, style of pack, and the amount of trimming necessary. Table 1 gives a guide for determining the number of cans needed.

Table 1 -- Approximate number of containers needed for canning a 50-pound crate or basket of sweetpotatoes:

| Tin cans | | | |
|---|---|---|---|
| Size | Number needed | Size | Number needed |
| No.2 | 34 to 36 | No.3 | 18 to 20 |
| No.2½ | 22 to 24 | No.10 | 5 to 6 |

Using this table: Suppose you are canning a carload of sweetpotatoes containing 500 50-pound crates, using No.10 cans. The table shows that, for each crate, you will need 6 cans. Therefore, for the carload, you will need 500 times 6, or 3,000 of the No.10 cans.

Note: To use No.10 cans, retorts must be equipped for cooling under pressure.

## Sugar

For each 50-pound basket or crate of sweetpotatoes that are to be packed in a light sirup as recommended, you will need 3 to 4 pounds of sugar. If it can be obtained, use a canners' sugar that is certified as suitable for canning low-acid vegetables. This type of sugar will reduce the possibility of spoilage due to certain bacteria (thermophilic) that may be present in ordinary sugar.

## Washing

Wash sweetpotatoes thoroughly to remove all dirt. This operation may be expedited by the use of a rotary washer or a strong water spray. If there is considerable dry dirt on the sweetpotatoes, it may be necessary to soak them in cold water before washing them.

## Grading for Size

Sweetpotatoes for canning should be graded for size. Separate the smaller ones, 2 inches in diameter or less, from the larger ones. If sweetpotatoes are to be steam-peeled, grade them prior to steaming. Steaming time varies with the size of the sweetpotatoes. If they are to be lye-peeled, grading may be done after peeling, while they are being trimmed.

## Peeling

Sweetpotatoes may be peeled by (1) steaming in a retort until the skin can be slipped off by hand, or by (2) treating in a lye bath until the skin is loosened and can be washed off under a cold water spray. Lye peeling is recommended for ease of operation, uniformity of quality of product, and slightly higher yield of finished product. Lye peeling is particularly suitable for sweetpotatoes that are to be packed in sirup because the peeled product remains firm and can be filled into cans without danger of overfilling. The lye-peeling method is also a good one to use for sweetpotatoes that are to be solid packed. Having the sweetpotatoes peeled before steaming permits more rapid handling at the time of filling, thus conserving heat and reducing the possibility of discoloration.

Lye Peeling: Detailed instructions for peeling by this method are given in "Lye Peeling of Products for Canning" published by the Agricultural Marketing Service, U.S. Department of Agriculture. As pointed out in these instructions, it is important to wash sweetpotatoes thoroughly to remove all residual lye on the surface of the sweetpotatoes. If this is not done the processing time given will not be adequate and spoilage may occur. As an added precaution, sweetpotatoes may be dipped in a citric acid solution made by adding 1 pound of citric acid to 10 gallons of water. The citric acid will neutralize any lye that may be present and will prevent the sweetpotatoes from darkening. To be effective, it will be necessary to add more citric acid from time to time or to make a fresh solution, since the solution weakens with use.

Steam Peeling: Place sweetpotatoes in galvanized wire baskets or perforated metal trays and steam in a retort at 240° F. Turn a full flow of steam into the retort and vent thoroughly to remove the air and bring the temperature of the retort to 240° F. as quickly as possible. If sweetpotatoes are to be packed in sirup they should be given the minimum steaming necessary to make the skins slip. If they are steamed until soft to the center they will be difficult to pack without overfilling the cans. The time required to bring the temperature up to 240° F. should be sufficient to loosen the skins. If sweetpotatoes are to be solid packed they should be steamed until soft and pliable. This will require from 3 to 10 minutes, depending on size of sweetpotatoes. Steaming time may also vary with the variety. For these reasons it is well to make trial runs to determine the best steaming time for the variety on hand.

At the end of the steaming period, open the retort promptly and remove the sweetpotatoes. Place them under a cold water spray or in a tank of water to cool sufficiently for handling. Slip the skins off by squeezing the sweetpotatoes through the hands. Canvas gloves will aid in handling the

sweetpotatoes rapidly. Work fast to fill sweetpotatoes into cans while hot, thus cutting down exhaust time and lessening discoloration.

## Exhausting

Exhaust the sweetpotatoes to the recommended center-can closing temperature. This is essential since the center-can closing temperature has a direct bearing on the processing time. Furthermore, exhausting will drive out the air and prevent discoloration. Failure to exhaust to the recommended center-can temperature or delay in processing after exhausting may cause spoilage.

To take the center-can temperature, insert the thermometer to the slowest heating point in the can contents. This point in sweetpotatoes canned in sirup is about halfway between the center and bottom of the can. In solid-packed sweetpotatoes, the slowest heating point is at the center of the can. Check the temperature in several cans. When the desired center-can temperature is reached, seal cans and process at once.

## Processing

Processing times given for sweetpotatoes are based on a temperature of 240°F., the minimum temperature necessary for destroying heat-resistant spores of bacteria in a reasonable length of time. To attain this temperature at sea level a corresponding pressure gage reading of 10.3 pounds is necessary. At altitudes above sea level, the pressure must be increased, as shown in table 2.

Table 2 -- Pressure gage reading based on temperature of 240° F., at specified altitudes

| | Feet above sea level | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0 | 1,000 | 2,000 | 3,000 | 4,000 | 5,000 | 6,000 |
| Gage reading(lbs) | 10.3 | 10.8 | 11.3 | 11.7 | 12.2 | 12.7 | 13.1 |

Regardless of the altitude at which processing is done, venting the retorts properly to force out the air is essential to attain the required temperature. The presence of air in the retorts may result in low-temperature spaces in which the cans are not fully processed. It is necessary, therefore, that all air be removed from the retort before starting the process if the full value of the process is to be realized and spoilage avoided. It is also necessary to bleed the retort during processing.

## Cooling

As soon as processing is completed, cool cans as rapidly as possible to 100° F. Check temperature by shaking can and holding it against the bare arm. The can should feel just slightly warm. It is necessary to leave enough heat in the cans to dry them so that rusting may be prevented. Cool No.2, No.2½, and No.3 cans in cold running water. No.10 cans must be cooled under pressure; otherwise the ends of the cans will buckle and the can seams may burst. When removing cans from the cooling water, tilt the

processing crate to drain off excess water. Air cool the cans until they are cold and dry by stacking them on their sides in double rows, spaced to allow for air circulation between the rows. Let stand overnight or longer to cool them completely. Do not case the cans of sweetpotatoes until they are thoroughly cooled, or they may stack burn.

## MARKING CANS

Mark the individual cans to show product, style of pack, and date processed. This may be done with a crayon or with phenol-free canners' ink. If cans are to be cased for distribution to schools or institutions, the cases should be stenciled to give the same information. How cans or cases are to be marked should be checked with the local or State distributing agency.

## STORAGE OF CANNED SWEETPOTATOES

As soon as cans of sweetpotatoes are thoroughly cooled, they should be removed from the cannery and placed in a cool, dry room. This is particularly important where canning operations are under way, as moisture will condense on the cans, causing them to rust. The storeroom should be well ventilated and as cool as possible without danger of freezing. Do not stack cans or cases against storeroom walls, or too near the ceiling. Provide racks to keep products off the floor.

## SWEETPOTATOES IN SIRUP

Container: Use plain cans (No.2, No.2½, No.3, or No.10).

Preparation: Wash sweetpotatoes carefully, grade for size, and peel by one of the methods given on pages 3 and 4. If possible, lye peel sweetpotatoes that are to be packed in sirup. When peeled by this method, they will remain firm and can be filled into cans without danger of overfilling.

Filling: Pack sweetpotatoes into cans to within 1/4 inch of top. Pack the lye-peeled sweetpotatoes firmly. Steam-peeled ones, if soft and pliable, should be packed loosely so that they will keep their shape. If they are mashed together, heat penetration will be retarded, and the process given will not be adequate. Leave small sweetpotatoes whole. Cut the larger ones in halves, quarters, or chunks, of uniform size. Pack the whole ones separate from the cut ones. Add boiling sirup to fill the cans completely. If automatic sealers are used, fill sirup to within 1/4 inch of top to prevent waste from overflow of sirup.

Use a light sirup made by adding 2-1/2 pounds of sugar to each gallon of water. Boil the sugar and water together for 5 minutes to dissolve the sugar and to remove air from the sirup. Skim off any scum that forms on top. Do not boil sirup longer than the time specified, as the water will evaporate and the sirup will thicken. If sirup cools before using, reheat it to boiling before filling into cans.

Exhausting: Exhaust sweetpotatoes to a center-can temperature of 165° F. (For instructions on taking the center-can temperature, see page 4.)

Sealing: Seal cans as soon as the exhaust temperature is reached. Do not permit cans to cool before processing.

Processing: Process sirup-packed sweetpotatoes at 240° F. (10.3 pounds pressure) as follows:

| Size of can | Minutes |
|---|---|
| No. 2 | 55 |
| No. 2½ | 60 |
| No. 3 | 60 |
| No. 10 | 75 |

Note: This corresponding pressure reading is for use at sea level. If processing is done at altitudes above sea level, the pressure must be increased to attain the required temperature of 240° F. (See page 4.)

Cooling: Immediately after processing is completed, cool cans as rapidly as possible to 100° F. (See instructions for cooling canned sweetpotatoes and recommendations for marking and storing them on page 5.

## SWEETPOTATOES, SOLID PACK

Container: Use plain cans -- No. 2, No. 2½, or No. 3 size. Do not use No. 10.

Preparation: Wash sweetpotatoes carefully, grade for size, and peel by one of the methods given on pages 3 and 4. Lye-peeled sweetpotatoes will need to be steamed until soft and pliable. This should be done just before filling into cans so that they will be hot. The hotter the sweetpotatoes are at the time of filling, the sooner they will reach the desired center-can temperature when exhausted.

Filling: Pack hot sweetpotatoes into cans, to fill them completely. Pack them closely and press them down so that no air spaces are left between the pieces. It is important to exclude air in order to prevent discoloration. Level off filled cans with blade of knife.

Exhausting: Exhaust solid-packed sweetpotatoes to 185° F. if possible. The higher the center-can temperature at the time of sealing, the shorter will be the processing time required. The center-can temperature must be at least 125° F. For instructions on taking the center-can temperature, see page 4.

Sealing: Seal cans as soon as they are exhausted. Do not permit cans to cool before processing.

Processing: Process solid-packed sweetpotatoes at 240° F. (10.3 pounds pressure). Depending upon the size of the can and the center-can temperature at time of sealing, process as follows:

| Size of can | Center-can temperature | Minutes |
|---|---|---|
| No. 2 | 125° F. | 105 |
| | 155° F. | 95 |
| | 185° F. | 85 |
| No. 2½ | 125° F. | 120 |
| | 155° F. | 110 |
| | 185° F. | 95 |
| No. 3 | 125° F. | 125 |
| | 155° F. | 115 |
| | 185° F. | 100 |

Note: This corresponding pressure reading is for use at sea level. If processing is done at altitudes above sea level, the pressure must be increased to attain the required temperature of 240° F. (See page 4.)

Cooling: Immediately after processing is completed, cool the cans as rapidly as possible to 100° F. (See instructions for cooling canned sweetpotatoes and recommendations for marking and storing them on page 5.)

Agriculture-Washington